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Towards improving peer review: Crowd-sourced insights from Twitter

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Abstract

Peer review is an essential part of academic publishing, yet many authors, reviewers, and editors have reportedly encountered problems with the review process. Some scholars view peer-review as a necessary process for the advancement of science, while other scholars argue that for many publishers and journals, both authors and reviewers are being exploited. The aim of this commentary is two-fold. First, to provide a narrative review of current perspectives and available research on the peer-review process to date, and second, to summarise potential solutions elicited from scholars on Twitter. A review of the literature identified several problems with peer-review including publication delays, an over reliance on a narrow pool of reviewers, threats to anonymity, perceived exploitation, as well as overworked editors. Recommendations to redress these issues that emerged from scholars on Twitter suggested publishers, journals, their editors and associate editors, universities, individual academics and their communities all have a role to play towards creating an equitable and fair system. This commentary aims to ignite conversations about improving the peer-review process.

Practitioner Notes

1. Many scholars believe that the peer review system is sub-optimal.
2. Research shows several problems with peer review such as publication delays, a deficit in suitable reviewers, and perceived exploitation amidst other challenges.
3. The process of peer review may create inequities for those who are on insecure contracts or in the early stages of their academic career.
4. Improvements to peer review may include creating incentives for reviewers and refining how reviewers are selected.
5. Action is needed by publishers, journals, individual academics and academic communities, and universities to improve peer review to make the system fairer and more equitable.

Keywords

Peer review, publishing, academia, publishers, journals

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Introduction

Peer review refers to an impartial – typically double-blind – examination and implementation of universal norms in scholarly academic work typically published in journals (Kerig, 2021). The intention is for experts of a specific topic area or field, to scrutinise the viability and quality of submitted work based on research integrity, rigour, and a broadly accepted ethos of what a high quality publication should look like. While peer review quality is maintained by reviewers tasked with roles such as methodological interrogation, the recognition of flaws and weaknesses of research designs, coherence of literature surveyed, and the adherence to publishing timelines (Kelly et al., 2014), the process of peer review can have a significant impact on research careers. Reviewers are often left to verify rigour and legitimacy of research and readiness of publication without appropriate guidance (Tennant & Ross-Hellauer, 2020). Reviewers also have a central role as gatekeepers in determining whether an article will be published. Peer review is generally held in high esteem as the gold standard for safeguarding high quality research and regulating the dissemination of research findings. Some scholars maintain that peer review is a fair process (Lee et al., 2013) but problems with peer review have not gone unnoticed in academic communities (Kerig, 2021). This commentary has two aims: first, to discuss the problems raised in the peer review literature, and second, to present and discuss proposed solutions elicited from Twitter users.

Identifying problems with peer review

Problems with the peer review process are receiving increased attention in the literature (Aczel et al., 2021; Datta, 2021; Sovacool et al., 2022) and on public platforms than in decades past. Several aspects of the current peer review system appear to be at odds with modern, progressive research practices (Tskakonas, 2021). For example, greater transparency is considered a key tenet of open science; potentially improving the reproducibility of research findings, allowing for a more dynamic dialogue between authors and other researchers and reducing the number of questionable research practices (Munafo et al., 2017). Contrary to this principle of openness and transparency, it has been argued that the anonymised reviewing process, applied to most journals, remains opaque, linear, and along with other parts of the scientific process, slow to adopt open and transparent practices (Morey et al., 2016).

In order to assess potential for change in the peer review process, it is critical that problems inherent to peer review are identified and understood; most notably because there is a need to mitigate risk and harm to those involved. The most common concerns with peer review practices identified in the literature include publication delays, an over reliance on a narrow pool of reviewers, threats to anonymity, perceived exploitation, and overworked editors.

Publication delays

A key issue that has arisen over time is that of publication delay. That is, the slow transition from data collection to a published article; a problem that has grown significantly over the last century (Christie et al., 2021). There are multiple (likely intersecting) reasons for publication delay, ranging from an ever-increasing number of published articles to an editorial process that may be under-resourced and unable to make enough use of researchers that aren’t

as established or well-known, for example, graduate students and early career researchers (Casado, 2018; Walker, 2018). A major source of delay stems from a decrease in willing reviewers and a delay in reviewers responding to invitations, an issue that has been exacerbated as a result of COVID-19 (Fox & Meyer, 2021).

Publication delays (resulting from the slowdown in peer review) have potential to harm research dialogue and could be particularly damaging to time-sensitive research areas that require immediate action. Christie et al. (2021) used a conservation evidence database to assess the length of publication delay (from finishing data collection to publication) in a literature that tests the effectiveness of conservation interventions. They found a significant increase in publication delay from 1912 to 2020 of 1.21 years, though no significant delays post-2000. Other research has found destination journal delays (from submission to publication) in biomedicine (9.5 months), chemistry and engineering (9 months), social sciences (14 months), and business and economics (17 months) (Bjork & Solomon, 2013).

The slowing of published research results poses problems for researchers, as well as policy makers, practitioners, and other interested organisations who have less time to act on potential findings that may have significant implications. Publication delay periods may also render findings obsolete or unusable. For example, newly published research may become immediately out of date if the article has dated references or overlooks recent events.

Publication delays can have a negative impact on career advancement, unfairly disadvantaging Early Career Researchers (ECRs), those on short-term contracts, and PhD researchers by potentially stunting or hindering chances of promotion or tenure. While the publishing process has been criticised for being slow for quite some time (Nguyen et al., 2015), a decline in willing reviewers creates further complexities to publishing timelines. Editors may struggle to find reviewers or the reviewers' themselves lack the time to complete reviews in a timely manner (Flatherty, 2022). While it has been suggested that rigorous research takes time (Frith, 2020), added publication delays may disrupt career progress for many academics. A problem given that publication is one of the core currencies of academia.

Over reliance on a narrow pool of reviewers

It is possible that journal editors are sending more review requests to established researchers over any other group, likely because they are viewed as the foremost experts in any given research area. The names of more established researchers will also appear first and more frequently in academic networks and search systems. With an ever-increasing number of research manuscripts produced every year, the idea that established academics review them all is unsustainable. It is also now commonplace for researchers to bemoan the sheer number of review requests and associated unreasonable turnaround times; an increasing number of published articles may be placing severe strain on the system (Kovanis et al., 2016; Osterath, 2016). At the same time, graduate students may have an interest in reviewing manuscripts for journals, though lack of training, information or guidance prevents them from familiarising themselves with the process (Nguyen et al., 2015).

Further, the research landscape in countries such as China has expanded rapidly (Conroy & Placket, 2022). Researchers beyond North America and Europe still exist on the fringes of these systems which could arguably suggest that reviewer resources are not being used to their full potential and that reviews are being conducted by a non-representative pool of academics from a narrow band of countries. For example, US researchers review more than they publish, and yet conversely, Chinese researchers, despite having one of the highest review acceptance rates, aren't asked to review as frequently (Elsevier, 2014). As research becomes more collaborative (both within and between countries), it may become more and more difficult to find reviewers without conflicts of interest; thus, narrowing the pool of potential reviewers.

While an 'automated' approach to peer review may appear useful (e.g., for performing relatively simple statistical error checks), more complex uses of automation have been criticised for being malignant and depersonalised (Fuchs 2018). These methods have the potential to continue a cycle of harm centred around the tunnelling of energy, attention, and resources to those already in potentially powerful positions (Birhane et al., 2021). Scholars should be wary of the idea of automating themselves out of a difficult situation, viewing more complex automation as something that can support decision making rather than as a sole determinant of outcome (Checco et al., 2021). A shift in focus to making better use of a very large, often under-utilised global network of younger researchers currently working outside of Europe and North America (as well as within it) would constitute a more pertinent response to peer review delays. As well as promoting and encouraging the use of journals that make the biggest efforts in this direction.

Threats to anonymity

There have been calls for greater transparency in the peer review process (Tennant, 2018). For example, it has been suggested that reviewers forgo anonymity with the uptake of open peer review reports. It is thought that a more open reviewer/author dialogue has the potential to increase reviewer accountability, reduce unnecessary disparagement, improve feedback quality, and potentially support a system where reviewers are rewarded for their work (financially or otherwise) (Foxe & Bolam, 2017). However, contrary to this suggestion, it has been shown that reviewers generally prefer anonymity (Ross-Hellauer et al., 2017). Academics report that they are less likely to agree to review if their identities will be revealed (Mulligan et al., 2013) and are less likely to produce honest reviews (Baggs et al., 2008; Publons, 2018). These findings may suggest that reviewers prefer to review in safe environments without recourse for their feedback. In competitive academic environments, particularly where jobs and resources are in short supply, a retaliatory response can be incredibly harmful to early career researchers. The short-term solution to risky, hostile environments is to protect underserved populations with anonymity. However, a more sustainable long-term solution is to cultivate academic environments where people of all levels feel safe to share their honest opinions without the risk of career harm and abuse.

Perceived exploitation

Publishing houses make profits from subscriptions and journal sales and yet the authors, reviewers, and editors that create this content do not generally benefit from those revenues; much of this labour is performed free of charge. In some institutions, particularly for staff with permanent contracts, this work is classified as service or engagement to your discipline. Many scholars believe this system functions from traditional roots of reciprocity, viewed as an accepted part of the academic job; where academic citizenship and goodwill, derived from having your work reviewed as well as reviewing for others, is considered a form of payment in and of itself. However, for those who are PhD researchers, insecurely employed, those on short of fixed-term contracts, or within their early career especially, the feeling that this work is free labour and occurring well beyond traditional contracted work hours cannot be overlooked. Other feelings of exploitation emerge from the greater number of review requests, pressures of time constraints to review, and increasing workloads.

Overworked editors

Prior to the pandemic, journal editors were experiencing high workloads and difficulties finding reviewers, a situation that worsened with the advent of the pandemic itself (Bauchner et al., 2020; Chung et al., 2020; Fox & Meyer, 2021). The impact of the pandemic did not affect everyone to the same degree. While for some there might have been a reduction in research output, for example as a result of childcare responsibilities during lockdown or fieldwork restrictions, others have experienced a sharp increase in research output, resulting in changes to article submission rates and subsequent editor (and reviewer) workloads. Else (2020) demonstrated that there was a sharp increase in papers in 2020, with COVID-19 related research understandably dominating. However, it is important to point out that this increase in output was highly gendered, with women experiencing a paper penalty (see Allen et al., 2021 for a critical review).

The current paper

A review of the literature demonstrates that the peer review process has several identified problems such as publication delays, a deficit in suitable reviewers, and perceived exploitation amidst other challenges that may be creating gross inequities to those who are on insecure contracts or in the early stages of their academic careers. Academics, through the sheer nature of their work, solve complex problems, generate new theory and thought and enrich society. It is feasible that many of the problems that academics face surrounding peer review can be solved by academics themselves first offering solutions, and then acting. The aim of the second part of this paper is to explore feasible strategies and solutions elicited by academics to work towards a fair and equitable system.

On 6 June 2022, the lead author of this paper (@drkellyallen) retweeted and responded to a Twitter post by @billkakenmaster where he wrote of turning down a request to review an article for a journal. The reason given was simple: He felt that his time was worth far too much to carry out such activities for free. While it was later revealed that @billkakenmaster's post had been intended as satire, @drkellyallen's retweet and response about the difficulty she faced as a journal editor in finding reviewers generated considerable attention, attracting in excess of 577,000 post engagements (interactions with the post) (see Figure 1). The content of the direct and indirect responses varied

widely, ranging from general support for the reciprocal basis of traditional peer review to criticisms of the publishing industry's exploitation of free labour in pursuit of profit – particularly at the expense of ECRs, PhD researchers and academics in insecure employment. After a week of comments by academics inside and outside of traditional institutions, at varying stages of career, and from countries all around the world, it was clear that the comments collectively represented a valuable resource. Embedded in the freewheeling discussion about this important topic were dozens of well-thought-out ideas for improving the mechanics of academic publishing. Rather than see them wasted, the authors of this paper decided to compile, categorise, and summarise the productive contributions with consideration to the ethical use of Twitter data (Gold, 2020) to provide a collection of ideas on which journal editors, publishing houses, and academics themselves can draw. We informally present the suggestions to improve peer review herein.

Figure 1

A screenshot from Twitter of the original retweet of @billkakenmaster's post by @drkellyallen

Findings

Findings of this commentary suggest several areas for improvement. They include creating incentives for reviewers, improving the peer review process more generally, and refining how reviewers are selected. Increased support for ECRs, PhD researchers, and those who are casually or insecurely employed (as well as part-time staff and adjuncts) was also suggested. Such recommendations can be categorised as improvements that could be undertaken by publishers, journals, individual academics and academic communities, and universities.

What publishers can do

A repeated concern with the current system was that the use of free labour by for-profit publishing companies was fundamentally exploitative. This common sentiment needs to be acknowledged and engaged with by publishers and

editors beyond the standard argument that the industry provides a service to academics conceived of as a unified community. Many people believed that reviewers should be paid for their work. If publishers do choose to financially incentivise contributions, then it will be necessary to consider the tax implications for reviewers and how these might vary across countries. Non-monetary rewards (e.g., books) could be a solution to mitigate some of the ethical concerns with financial incentives. An alternative way to 'balance the books' would be for journal publishers who make significant profits to contribute a portion of that profit to the funding of research or research-adjacent activities. Ideas on how to manage this kind of redistribution included the provision of support to a reviewer's department, where the small income stream might go towards running costs or funding activities such as ECR grant writing, peer review training, scholarships, and sponsored writing retreats.

Another suggested approach was to provide reviewers with 'platinum' access to journals, allowing them to publish and access articles for free for a given period or to grant them annual subscriptions to major scientific journals. Some people suggested offering vouchers covering publication fees for future submissions. Others suggested all journals in general could waive article processing charges in exchange for reviewing a given number of papers.

Additionally, reviewers could be recognised and acknowledged on a journal leaderboard, with statistics on the number of papers reviewed, however downsides were raised of publishing reviewer names, how this might affect blind submissions, and how leader boards can also accentuate inequities in academia for certain groups. It may contribute to a system already perceived as more competitive than collaborative. A related suggestion was to find other ways to "gamify" the system to make reviewing more enjoyable. However, when considering these options, it is important to bear in mind that such incentives could create a Goodhart's law problem where people find ways to game the new metric or the new incentives. It may be that some of the solutions posed could replicate the same mechanisms that provoked the problems identified with peer review in the first place, especially those around indicators of productivity. Concerns were raised that incentives might increase the acceptance rate of review invitations but at the expense of review quality; one might accept only to receive the reward while putting minimal effort into the activity, or one might even accept the role if not truly an expert in the subject matter.

What journals can do

Recommendations to journals broadly included improving their workflow and refining the process for identifying appropriate reviewers in six keyways. Firstly, processes around inviting reviewers were highlighted. Suggestions were made to ensure that journals tailor their invitations to target suitable reviewers with appropriate skill sets (e.g., in methodology, research design, or theory and topic knowledge). Some people felt that invitations need to be sent to post-doctoral researchers and non-tenure track faculty, not just tenured faculty. Several commenters suggested that people in industry who want to review are also missing out unnecessarily. One suggestion was that journals and editors should try to reach out to both retired experts and those employed in industry for reviews. A further suggestion was made to include community members (end-users/stakeholders) in the review process. This would not necessarily replace scholarly reviews, but could enhance the review process, especially when the findings relate to applied research (e.g., with implications for children, teachers, schools).

In addition, invitation letters could include additional information for a potential reviewer to make an informed decision on whether to accept. This information might include the financial status or model of the journal (i.e., profit or non-profit), journal metrics, and why reviewing for the journal is important for the field or discipline (e.g., if a journal was associated with a scientific society). Invitation letters should clearly state expectations for ECRs and PhD researchers. Many people articulated that reviewing was important for the scientific development of PhD researchers.

Based on the comments, ECRs, PhD researchers and the contractually employed deserve special attention. Several commenters raised that these groups may be interested in reviewing (and may benefit from it) but are rarely invited. One suggestion was to identify these groups and partner with PhD programs to solicit reviews from interested PhD researchers. However, others argued that even asking a PhD researcher would be exploitative, with some people sharing that journal editors and publishers had made them feel guilty for not reviewing. In addition, most commenters agreed that ECRs, PhD researchers, and people insecurely/casually/part-time employed should be excluded from the 2-3 reviews per manuscript submission 'rule of thumb', which came up in many of the twitter comments as how people manage the requests for reviews. ECRs and PhD researchers could also benefit from knowing which journal invites come from good quality journals and which ones come from predatory journals. While universities and faculties attempt to provide a filtering process, the creation of a searchable journal database was one suggestion. Publishers also have a potentially powerful role to play here. Expert reviewers could run workshops and publishers could offer free professional development guidance on how to review.

Secondly, new data could be elicited from prospective authors to journals on submission which identifies them as needing a fast-track review to facilitate career progression. Reasons may include a precarious contract, ECR, or PhD researchers. Fast-track reasons could be kept blind from reviewers, though they could be alerted that the author needed a fast-track. Where some journals offer fast-track reviews for reasons such as the time-sensitivity of the data (for example, in relation to the unfolding COVID-19 pandemic) or in exchange for payment, adding the above criteria could support ECRs, PhD researchers, and those on limited contracts to get timely publications out in order to progress to the next step of their careers.

Third, journals could accept unedited reviews from previous submissions to other journals in cases where an article was reviewed extensively but rejected. This would allow articles rejected by top-tier journals (who often have high rejection rates; Allen et al., 2020) to be published elsewhere in cases where the rejection does not reflect the quality of the work. From a wider perspective, all publishers could have an internal transfer system for reassigning articles to the most suitable journal in their list when an article is rejected as unsuitable for the journal to which it was originally submitted (cf. Neuroscience Peer Review Consortium; Saper et al., 2009).

Fourth, potential reviewers are overwhelmed by scale and complexity. Several people noted that they receive too many review invitations, which can be overwhelming. Publishers could consider how this could be better managed. Additionally, one person commented that the log-in process for journal systems is becoming more complex. While there are valid security measures for doing so, both issues act as deterrents to rapid invitation replies. Relatedly,

declining invitations to review could be easier for users (i.e., a single email click) with no auto follow-up email from the editor "expressing disappointment".

A fifth area of improvement relates to transparency of the peer review process. Journals and publishers need to be clear and transparent about publishing and production timelines, as well as rejection rates. Reviewers may benefit from clear(er) explanations about how their reviews will be used (i.e., should editors override recommendations). Some people felt that the timelines for reviews were too short and that requesting additional time for a review should be an easy process. Academic institutions could acknowledge publication delays and put in place systems to accommodate these in internal performance review processes. This is particularly important for ECRs, PhD researchers, and those awaiting tenure.

Another suggestion to improve transparency was a move towards an open review process where journal editors choose relevant, high quality papers based on reviews and publish them. For instance, community review hubs could be established that publish reviews alongside a mechanism for journals to bid or make offers on the publication. Another commenter suggested that journals could create a priority queue that privileges authors who have volunteered more times as reviewers in non-profit journals. However, concerns were also raised that this may introduce non-scientific factors into prioritising research publications and disadvantage certain groups (e.g., those who have less time due to other responsibilities).

Furthermore, journals could publish anonymised peer review reports, bringing transparency to the process and making it more difficult for predatory publishers to operate. One commenter suggested that transparent reviewing might lead to a reduction in low-quality reviews. Publishers and journals should have clear policies and practices for managing unproductive reviews or harassment experienced in the review process. Someone felt that this was more commonly expected by people from marginalised groups, and that this could be taken into consideration when designing processes.

Finally, journal publishers could pay for their own in-house full-time staff reviewers who are trained, knowledgeable, and sensible. Relatedly, some commenters suggested that we need to build communities around the review process so that reviewers become known and appreciated by editorial teams.

What universities can do

Institutional changes were suggested to ensure that contributing to the academic community through peer review is included as a performance metric. This would have the benefit of making clear that reviewing is part of the paid work of an academic staff member, with a formalised expectation explicitly acknowledged in workload allocations. If reciprocity in reviewing/publishing is something an institution values, then this needs to be clear. If it is not, institutions need to actively seek alternative approaches. Changes were also suggested to the structures of rewards and evaluations in academia. For example, promotion applications, funding applications, and biographies might include a statement about peer review engagement, with institutions and funding bodies obligated to weigh this alongside other factors. Publishers or universities could also offer "peer review" awards to acknowledge outstanding contributions in this area.

What individual academics and academic communities can do

Four areas of improvement arose in relation to academics specifically. Firstly, some people felt that tenured staff who publish should commit to 1-2 reviews per year or 2-3 reviews per paper they publish. However, others disagreed with quantity limits/requirements. Secondly, academics could be further encouraged to support the journals of the professional or scientific societies to which they belong, or those that are run on a not-for-profit basis. Thirdly, institutions, publishers, and academics need to find ways to work closely to prevent conflicts of interest and corruption. Some people felt that editors and peers should not judge colleagues for not reviewing, since unknown personal circumstances (e.g., caregiving responsibilities) may preclude them taking on such responsibilities. Fourth, academic communities could encourage their members to sign up to a searchable repository or database to make it easy to find experts in certain fields, especially those who might not normally be approached to review (e.g., early career, PhD researchers, global south scholars, and women).

A call to action

Editors and Associate Editors have a unique role to play in representation and advocacy, bridging the gap between academia and publishing. Institutions and publishers can work together to create broader changes to the system. The feedback from Twitter highlights that peer review is facing systemic challenges that need systemic solutions. Some of the suggested changes will require cultural change and the building of new institutions while others need to be carefully evaluated for practicality and to make sure they represent improvements on the current system. However, at least some of these suggestions can be implemented at little cost and within a short time frame.

The current review of the literature and feedback from Twitter shows that many people believe that the peer review system is sub-optimal. The review shows that the system may simultaneously burden the most successful whilst not sufficiently making use of other groups (such as ECRs), perpetuating existing inequalities. Peer review training for graduate students along with proper integration into the system would be a step in the right direction, along with appointing more diverse groups of people at all levels of the peer review process. Whilst there is a reluctance and (an understandable) fear of removing anonymity, recent research has shown how powerful greater transparency can be (Besançon et al., 2021). Incentives (e.g., rewards for positive contributions) need to be developed that will help ensure that reviewers and authors feel protected from potential retaliation. A longer-term strategy should focus on making the peer review process and wider research landscape more inclusive and accepting of researchers of all levels, and critically from all parts of the world. This involves increased representation of women and minoritized groups in positions of power. The onus is on journals to appoint more diverse editors and to encourage researchers earlier on in their careers to engage with them; both directly and via the databases that they consult (Kirman et al., 2019). Crucially, PhD researchers, and particularly those outside of North America and Europe should be actively encouraged into the system as a core part of the peer review process, and not as an extension.

Conclusion

The pandemic has amplified pre-existing challenges to scholarly peer review. The 577,000 Twitter post engagements arising from one academic's proclamation on 6 June suggest that such challenges potentially run deep and wide across academia. Challenges include publication delays, an over reliance on a narrow pool of reviewers, threats to anonymity, perceived exploitation, (especially those new to the profession or who are contractually employed), as well as overworked editors. The recommendations suggested in this paper concern publishers, journals, their editors and associate editors, universities, individual academics and their communities. These recommendations are, like the Twitter engagement described above, the start of a conversation about how to improve the peer review process. This commentary has scratched the surface of deeper, interrelated problems and potential solutions to the challenges of peer review; there is clearly more to be done to understand these challenges in order to further develop productive spaces and actionable solutions.

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